

THERAPY ADHERENCE OF 40-75 Y.O. HYPERTENSION RESPONDENTS USING MORISKY INSTRUMENT IN NGEMPLAK, SLEMAN, DIY (STUDY ON AGE, DEMOGRAPHY, SOCIAL, AND LIFE-STYLE FACTORS)

KETAATAN TERAPI RESPONDEN HIPERTENSI USIA 40-75 TAHUN MENGGUNAKAN INSTRUMEN MORISKY DI KECAMATAN NGEMPLAK, SLEMAN, DIY (KAJIAN USIA, DEMOGRAFI, SOSIAL DAN GAYA HIDUP)

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Received May 8, 2017; Accepted August 8, 2017

ABSTRACT

Hypertension is systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg. The risk factors of hypertension consist of age, life-style, demographic, and social factors. The risk factors have a significant association with antihypertension adherence. Adherence is the suitability of patient behavior to the prescriber's recommendations. Morisky instrument can be used to measure the level of hypertension therapy adherence. The aims of this study were to assess respondent's profile and therapy adherence based on age, life-style, demographic, social factors among the subjects in Ngemplak, Sleman, Daerah Istimewa Yogyakarta (DIY). Total respondents were 63 respondents. The observational study was done with cross-sectional design. Technique for determining the location used random sampling, data were collected by door to door in the villages of Morangan, Jimat, and Jelapan. Data analysis used chi square with 95% confidence level. There were 23.8% good adherent and 76.2% poor adherent subjects to antihypertensive medication. There was no significant difference between age, life-style, demographic, and social factors to the level of hypertension therapy adherence. However, it was found that controlled blood pressure (p -value < 0.01) were significantly associated with therapy adherence. This study also found that SBP at age 60-75 years and 40-59 years was significantly different (p -value < 0.05).

Keywords: adherence, age, demography, hypertension, social, life-style

ABSTRAK

Hipertensi yaitu tekanan darah sistolik (TDS) ≥ 140 dan/atau tekanan darah diastolik (TDD) ≥ 90 mmHg. Faktor resiko hipertensi adalah usia, gaya hidup, demografi, sosial. Faktor resiko tersebut dapat mempengaruhi ketaatan terapi antihipertensi. Ketaatan adalah sejauh mana kecocokan perilaku pasien terhadap rekomendasi yang diberikan prescriber (dokter). Instrumen Morisky digunakan untuk mengukur tingkat ketaatan terapi hipertensi. Penelitian ini bertujuan untuk mengetahui profil ketaatan responden dan perbedaan tingkat ketaatan terapi antar kelompok usia, gaya hidup, demografi dan sosial responden hipertensi di Kecamatan Ngemplak, Sleman, DIY. Responden penelitian sebanyak 63 responden. Penelitian ini merupakan penelitian observasional, jenis rancangan penelitian cross sectional. Penentuan lokasi penelitian dilakukan secara random, pengambilan data dilakukan secara door to door di Padukuhan Morangan, Jimat, Jelapan. Analisis data menggunakan uji chi square dengan taraf kepercayaan 95%. Sebanyak

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23,8% responden memiliki tingkat ketaatan tinggi dan 76,2% memiliki tingkat ketaatan rendah. Hasil penelitian menunjukkan bahwa tidak terdapat perbedaan bermakna pada kelompok usia, gaya hidup, demografi dan sosial terhadap tingkat ketaatan terapi hipertensi. Terdapat perbedaan pengendalian tekanan darah antara responden dengan ketaatan tinggi dengan responden dengan ketaatan rendah (nilai- $p < 0,01$). Selain itu terdapat perbedaan TDS yang signifikan antara responden berusia 60-75 tahun dengan 40-59 tahun (nilai- $p < 0,05$).

Kata kunci: ketaatan, usia, demografi, hipertensi, sosial, gaya hidup

INTRODUCTION

Hypertension is an increase in systolic blood pressure ≥ 140 mmHg and diastolic ≥ 90 mmHg at two measurements in a calm state (Ministry of Health, 2014) which becomes the main cause of death in the world. Results of basic health research in 2013 stated that the prevalence of hypertensive patients in Indonesia reached 25.8%, while the case of hypertension in DIY reached 25.7% (Ministry of Health, 2013). The prevalence of hypertension in Sleman Regency was also quite high, i.e. 39.65% (Sleman Health Office, 2011).

Increased blood pressure can be affected by several factors, namely age, gender, obesity, additional illness, dietary regulation, smoking, and physical activity (NHS, 2016). In addition, it is also influenced by antihypertensive treatment adherence. Antihypertensive drugs are effective and efficient if the patient drinks as prescribed (Rigby, 2015). Compliance of respondents can be measured by Morisky Medication Adherence Scale-8 Item (MMAS-8) (Morisky et al., 2008). This instrument is often used in various clinical conditions, in different populations, has been translated and validated in several countries (Tan et al., 2014). Based on a study, the high therapy adherence was 12% (Najimi et al., 2016) which showed a lack of adherence to hypertension therapy.

According to some studies, there is a significant association between therapy adherence to hypertension risk factors. One study stated that high adherence occurred among elderly respondents (Lee et al., 2013). Other study suggested women tend to be more adherent to therapy than men (Ambaw et al.,

2012). Respondents with BMI ≥ 30 and respondents who did not have other chronic diseases tend to be disobedient compared to those with BMI < 30 and have other chronic diseases (Demoner et al., 2012). Another study stated, dietary regulation and smoking activity determine therapy adherence. Respondents who regulate dietary and consume salt < 5 grams have better adherence. Subjects who smoke also tend to be more disobedient to therapy than non-smokers (Kamran et al., 2016). Physical activity also affects the adherence of hypertension therapy. Respondents who exercise regularly are more adherent to therapy than respondents who do not exercise (Venkatachalam et al., 2015).

Occupational factors, income and health insurance also affect therapy adherence. Respondents with greater incomes tend to be significantly more adherent than respondents with lower incomes (Saepudin et al., 2013). A study mentioned, patients who have no health insurance or low income tend to be disobedient (Jin et al., 2008).

Based on the above description, the researchers conducted a study related to the respondents' adherence to hypertensive therapy in Ngemplak District, Sleman, DIY. The objective of this study was to find out the antihypertensive therapy adherence profile of the respondents and the significant difference in the level of therapy adherence and blood pressure control among age groups, demographic factors (gender, BMI, and additional disease), lifestyle factors (diet, smoking and physical activity), and social factors (occupation, income, and health insurance) of hypertensive respondents in Ngemplak Sub-district, Sleman, DIY.

METHODS

This study employed analytic observational with cross-sectional study design. The study was conducted after obtaining ethical clearance no. 272/C.16/FK/2016 from Medical Research Ethics Commission Faculty of Medicine, Universitas Kristen Duta Wacana. The research was conducted in Morangan, Jimat and Jelapan villages, Ngemplak District, Sleman, DIY. The villages were chosen with multi-stage random sampling, while sampling method was with cluster random sampling. In this study, a cluster is a village. The research respondents were residents aged 40-75 years who met the inclusion criteria, i.e. respondents who had undergone therapy and were willing to participate in the study by signing informed consent. The exclusion criterion is either the blood pressure can not be measured or the subjects can not communicate verbally.

The independent variables of this study were age, demographic factors (sex, BMI, and additional disease), lifestyle factors (diet, smoking, and physical activity), and social factors (occupation, income, and health insurance). BMI was categorized to be normal (<23 kg/m²) and overweight (≥ 23 kg/m²). The dietary group was divided into those regulating and were not regulating diet as

measured using the questionnaire. The answer "Yes" is given a score of 1 and the answer is "no" given a score of 0. If the score ≥ 6 then it was categorized as regulating diet. Meanwhile, if the score <6 then they did not regulate the diet (Susilo, 2015). Smoking variable was categorized into smoking (daily smoking, occasional smoking, ever smoking a year ago, or in the home/work environment there are smokers) and not smoking. Physical activity was categorized into routine physical activity (jogging, walking, running or cycling at least 1 time per week) and not routine (if <1 time/week or never at all). The occupation variable was categorized into jobs with light work activity (not much labor) and heavy work activities such as lifting stones to trucks and hoeing. The income variable was categorized based on minimum wage in Yogyakarta Area in 2016 for Sleman Regency, which is Rp. 1,338,000.00. The dependent variable was the level of adherence to therapy of hypertensive respondents, and the disturbance variables were the possibility of distress, the respondent's perception of taking antihypertensive drugs, the level of honesty of respondents and the knowledge of respondents about hypertension and the drugs they consumed.

Table I. Operational Definition of Regulating Diet

Statement	Remark
Thinking of the food to eat	Yes/No
Regulating saltiness while cooking food	Yes/No
Consuming home-cooked foods instead of instant or canned foods	Yes/No
Consuming no more than 3 plates of rice per day with normal portion (handful)	Yes/No
Not adding soy sauce, extra salt, sauce while eating	Yes/No
Consuming fried snacks ≤ 3x a week	Yes/No
Drinking milk (low fat)	Yes/No
Consuming fatty meat, fat, coconut milk ≤ 3x a week	Yes/No
Consuming vegetables ≥ 1x a day	Yes/No
Consuming fruits ≥ 1x a day	Yes/No

The minimum number of respondents in the study was calculated by the following formula:

$$n = \frac{(Z_{\alpha})^2 \times P \times Q}{d^2} = \frac{(1.96)^2 \times 0.12 \times 0.88}{0.10^2} = 40.57 \text{ (rounded up to 41)}$$

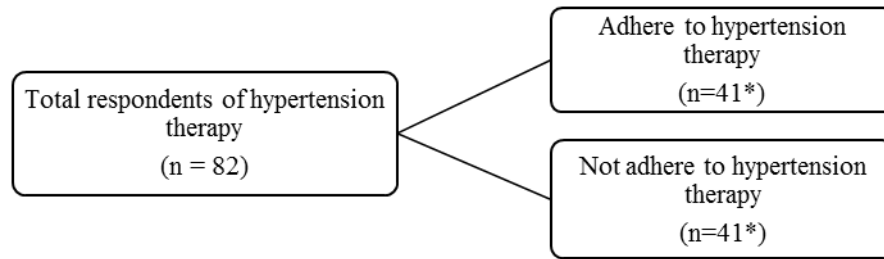


Figure 1. Diagram of research samples calculation in Ngemplak District, Sleman, DIY. The asterisk-marked n values (*) showed the calculation results with the formula to determine the number of samples

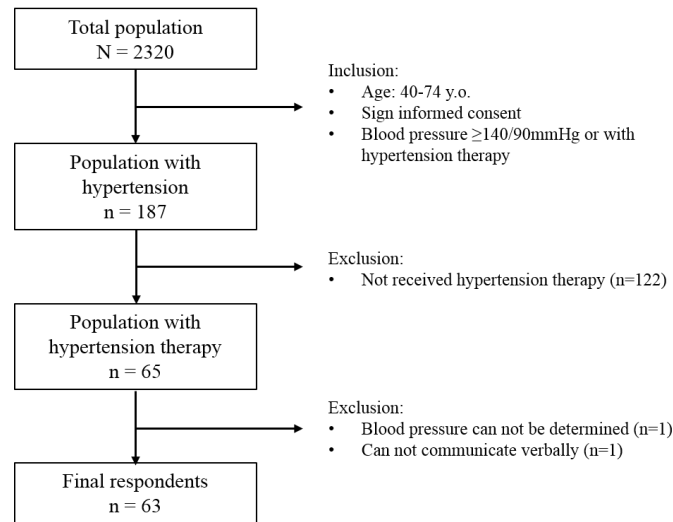


Figure 2. Diagram of respondents in Ngemplak District, Sleman, DIY

The value of Z_{α} was the Z_{α} statistic value on the standard normal curve at significance level (1.96). P is the prevalence of hypertensive therapy adherence, i.e. 12% (Najimi et al., 2016). The Q value is $1-P$ and d was the desired absolute precision of 0.1 (Arief, 2008).

Based on calculation, it was obtained 41 respondents who were adherent to therapy, so the total respondents required was 81 respondents. However, the researchers only managed to invite 63 respondents because of the limitations of the number of subjects that the researchers could meet during the process of data collection. The data were collected on a door-to-door basis using MMAS-8 to measure the level of treatment adherence and questionnaires to gather respondents' information. In addition, a digital sphygmomanometer was used to measure blood pressure, height measuring instruments,

and weight scales. The blood pressure was measured 2 times with a 2 minute pause. If the measurement difference was >10 mmHg then a third measurement was made. Two adjacent results were being averaged. The systolic blood pressure ≥ 140 mmHg and/or diastolic ≥ 90 mmHg were included in hypertension category (Ministry of Health, 2014).

The MMAS-8 instrument has been translated into Bahasa Indonesia and verified by two pharmacists and 15 respondents in Gondanglegi village, Ngemplak, Sleman, DIY. The result, MMAS-8 Indonesian version could be accepted after going through several revisions. This instrument was validated using 20 respondents and then Spearman correlation test was conducted to see the correlation coefficient (r) and p value. Items 1-8 had a significant correlation with the adherence score ($p < 0.05$), except items 3 and 7 ($p > 0.05$). There were 2 items with weak

correlations ($r = 0.2- <0.4$), 2 medium correlation items ($r = 0.4- <0.6$), 3 strong correlation items ($r = 0.6- <0.8$) and 1 very strong correlation item ($r = 0.8-1$) (Dahlan, 2013). According to the test results, the instrument was invalid because there were 2 items with weak correlation. This instrument was still employed because this instrument was an instrument that had been widely used and declared valid for measuring respondents' adherence to therapy. The reliability test was expressed in Cronbach's α and was considered reliable if > 0.7 (Dehghan et al., 2015). The Cronbach's α MMAS-8 in this study was 0.71. The height gauges and weight scales have been calibrated in Yogyakarta Metrology Center. The digital sphygmomanometer validation was performed by comparing the measurement results using a digital sphygmomanometer with mercury sphygmomanometer on three respondents, and then paired T-test was conducted.

The adherence was measured by MMAS-8. Scores > 6 were categorized as high adherence and ≤ 6 belonged to low adherence (Li et al., 2014). Items 1-7 were answered with "yes/no". The answer "yes" was given a score of 0 and "no" was given a score of 1, except for item 5, i.e. if "yes" was given a score of 1 and "no" was given a score of 0. Item 8 was answered with a 5-point likert scale (0-4) then standardized by dividing the product by 4 then was added with the score of items 1-7 (Cuevas et al., 2015).

Statistical data analysis was conducted using IBM SPSS Statistics 22 program. After Kolmogorov-Smirnov test, the data was not normally distributed, therefore the analysis then used non parametric statistic (CI 95%). The data central tendency used was the median and the size of the distribution was using range. Chi Square test was used to find out the difference of adherence level to therapy between variable groups and the difference of blood pressure control between high and low adherence groups. The Chi Square test result was showed in p value. The $p < 0.05$ indicated a significant difference in the

degree of adherence between the variables. If the requirement of Chi Square test was not met, then Fisher test was employed. Binominal test was performed to determine the difference of proportion between groups of variables. Mann Whitney test was used to find out the differences in blood pressure and MMAS-8 score among the variable groups. Binomial and Mann Whitney tests were expressed in p values. The $p > 0.05$ indicated that there was a significant difference (Dahlan, 2013).

RESULTS AND DISCUSSION

The research respondents were 63 residents from Morangan, Jimat and Jelapan villages, Ngemplak District, Sleman, DIY. There was a significantly different proportion in the sex, occupation, health, diet, physical activity, education and adherence to therapy. As many as 76.2% of respondents had low adherence and 23.8% had high adherence (Table II). The high prevalence of adherence in a study in Kintamani district, Bangli was only 30% (Hazwan et al., 2017). This showed that public awareness of hypertension therapy was still low.

The low level of adherence to this therapy can be caused by the respondent being not diligent to check blood pressure, being difficult to remember the information and not being honest in answering the statements. Therefore, the monitoring of therapy adherence needs to be improved. Other factor related to the level of adherence to therapy was the proximity of the location of clinic/health center and social support of family or friends to help reminding the respondent to adhere to the therapy of hypertension (Puspita, 2016). A study also stated that there was a correlation between the level of knowledge of hypertension and patient's adherence to therapy. The better the respondent's knowledge, the better the awareness to seek medical treatment (Pratiwi et al., 2017).

Table II. Profile of Antihypertension Therapy Respondents in Ngemplak District, Sleman, DIY

Variable	Respondent ¹ (n=63)		MMAS-8 ² Score
	N	%	Median (Min-Max)
Age	40-59 years	29	46.0
	60-75 years	34	53.9
Sex	Female	42*	66.6
	Male	21*	33.3
Income	≥minimum wage	31	49.2
	<minimum wage	32	50.7
Occupation	High labor	36*	57.1
	Low labor	27*	42.8
Health insurance	Yes	45*	71.4
	No	18*	28.5
BMI	< 23kg/m ²	30	47.6
	≥ 23kg/m ²	33	52.4
Additional disease	No	33	52.4
	Yes	30	47.6
Diet	Regulating	46*	73.0
	Not regulating	17*	26.9
Smoking	No	32	50.79
	Yes	31	49.21
Physical activity	Routine	45*	28.57
	Not routine	18*	71.43
Education	>JHS	15*	23.8
	≤JHS	48*	76.1
Adherence	High	15*	23.8
	Low	48*	76.1

Note: 1 = Binomial test; 2 = Mann-Whitney test; *p-value<0.05, significantly different; minimum wage = regional minimum wage; BMI = *Body Mass Index*; JHS = Junior High School

In this study, significant difference was found only in the MMAS-8 median score of adherence variables. Age, sex, health insurance, BMI, additional disease, diet, smoking, physical activity, income, occupation, and education variables showed no significant difference (Table II).

This study showed that there was a non-significant difference in therapy adherence among research variables (Table III). Other study suggested that there was a significant difference in the level of adherence among age groups. Respondents aged ≥50 years were more adherent than those aged <50 years (Ahmed, 2015). Other study suggested that women had higher levels of adherence than men. In addition, respondents who did not have an additional disease also had higher adherence. The degree of adherence decreased when there was an increase in the frequency of taking drug and the amount of drug taken (Ramli et al., 2012). Overweight individual

had a 39% lower prevalence related to therapy adherence (Warren-Findlow et al., 2012).

There was no significant correlation between income, occupation and health insurance with adherence to therapy in this study. One study mentioned that unemployed patients tend to be less adherent due to lack of health care subsidies (Lee et al., 2013). A study in Canada mentioned that the type of medical insurance did not affect the degree of adherence to antihypertensive therapy. However in bitherapy, patients with personal health insurance were more adherent to their therapy (Despres, 2014). Another study mentioned patients who did not have health insurance or with low income tend to disobey therapies. Cost and income were two interrelated factors (Jin et al., 2008). Respondents with higher incomes were more likely to adhere to antihypertensive drugs ($p < 0.05$) than respondents with lower incomes (Saepudin et al., 2013).

Table III. Association between variables of respondent in Ngemplak District, Sleman, DIY and hypertension therapeutic adherence using MMAS-8 instrument

Variable		Adherence		OR (95% CI)
		Low (n (%))	High (n (%))	
Age	60-75 years	25 (73.53)	9 (26.47)	0.73
	40-59 years	23 (79.31)	6 (20.69)	(0.22-2.35)
Diet*	Regulating	36 (78.26)	10 (21.74)	1.50
	Not regulating	12 (70.59)	5 (29.41)	(0.43-5.27)
Smoking	No	27 (84.38)	5 (15.62)	2.57
	Yes	21 (67.74)	10 (32.25)	(0.76-8.67)
Physical activities*	Routine	36 (80.00)	9 (20.00)	2.00
	Not routine	12 (66.67)	6 (33.33)	(0.59-6.79)
Sex	Female	33 (78.6)	9 (21.4)	1.47
	Male	15 (71.4)	6 (28.6)	(0.44 – 4.87)
BMI	<23kg/m ²	21 (70.0)	9 (30.0)	0.52
	≥23kg/m ²	27 (81.8)	6 (18.2)	(0.16 – 1.69)
Additional disease	No	26 (78.8)	7 (21.2)	1.35
	Yes	22 (73.3)	8 (26.7)	(0.42 – 4.32)
Income	≥minimum wage	26 (83.8)	5 (16.1)	2.36
	<minimum wage	22 (68.7)	10 (31.2)	(0.70-7.96)
Occupation*	High labor	34 (76.7)	10 (23.2)	1.21
	Low labor	14 (75.0)	5 (25.0)	(0.35-4.20)
Health insurance*	Yes	33 (94.2)	12 (34.2)	0.55
	No	15 (83.3)	3 (16.6)	(0.14-2.24)

Note: p-value was tested using chi-square, except * with Fisher test. OR:Odds Ratio. BMI:Body Mass Index. Minimum wage: Regional minimum wage. labor: physical activity; all variables did not have significant difference on adherence level ($p>0.05$)

Adherence levels between diet, smoking and physical activity groups were not significant (Table III). Some studies stated, the level of adherence in the lifestyle group was significant. The respondents who regulated their diet, consumed salt <5 grams, exercised and did not smoke had better level of adherence (Venkatachalam et al., 2015). Research on hypertensive outpatient setting stated, lifestyle factors, such as regulating diet, consuming salt ≤5 grams, doing physical activity > 30 minutes/day, and not smoking significantly influence adherence (Ahmed, 2015).

Differences in research results may occur due to differences in characteristics of study respondents and unbalanced proportion in high adherence and low adherence groups. Further, it might be influenced also by variables such as respondents' memory, daily activities, and family. Closer proximity to hospital also affected therapy adherence. The

closer a hospital was, the adherence to antihypertensive therapy increased (Ambaw et al., 2012).

There was significant difference in systolic blood pressure in age, income and obedience variables (Table IV). The older the respondent was, the higher the blood pressure was. Respondents aged 60-75 years had a median systolic blood pressure higher than the respondents aged 40-59 years. One study stated that in individuals aged 40-70 years, any increase in systolic blood pressure of 20 mmHg or diastolic 10 mmHg increased the risk of Cardiovascular Disease twice (Chobanian et al., 2003).

Isolated systolic hypertension (ISH) is a state of high systolic blood pressure but not at diastolic blood pressure. ISH is common at age 50 or older. This condition can occur after long period of hypertension with or without any treatment. One study stated that systolic blood pressure will continue to increase at the

age of 30 to 84 years or more. This is related to changes in stiffness of arteries and arterioles or so-called Large Artery Stiffness (LAS). LAS is usually caused by the influence of arteriosclerosis and calcification. Meanwhile, diastolic blood pressure will increase until the age of 50 years and slowly decline at the age of 60 to 84 years (Pinto, 2006). Increased systolic blood pressure could increase the risk of death, coronary heart disease, stroke and end-stage of renal disease so that therapy is essentially performed to reduce the risk of complications (Gosmanova et al., 2016).

This study results stated that there was a significant difference between the adherence

level to therapy to blood pressure control (p-value <0.01, OR = 22.50). Blood pressure was not under control when systolic blood pressure ≥ 140 mmHg and/or diastolic ≥ 90 mmHg. Respondents with low adherence were at risk of having uncontrolled blood pressure compared with the adherent ones. This is consistent with a research suggesting that therapeutic adherence factors may affect blood pressure significantly (Noorhidayah, 2016). Therefore, it is necessary to educate and monitor antihypertensive therapy in hypertensive patients to control blood pressure and reduce the risk of Cardiovascular Disease.

Table IV. Profile of Blood Pressure based on Age, Sex, BMI, Additional Disease, Income, Occupation, Health Insurance, Diet, Smoking and Physical Activity

	Variable	n (%)	Median SBP (Range)	Median DBP (Range)
Age	60-75 years	34 (54.0)	165.0 (127.0-216.0)*	93.0 (78.0-129.5)
	40-59 years	29 (46.0)	147.0 (122.0-180.5)*	91.0 (76.0-114.0)
Sex	Female	42 (66.7)	154.8 (122.0-216.0)	92.0 (76.0-129.5)
	Male	21 (33.3)	164.0 (129.0-198.5)	90.0 (79.5-119.0)
BMI	< 23kg/m ²	30 (47.6)	154.8 (122.0-216.0)	90.3 (78.0-119.0)
	≥ 23 kg/m ²	33 (52.4)	158.5 (127.0-206.0)	92.0 (76.0-129.5)
Additional disease	No	33 (52.4)	153.0 (129.0-216.0)	89.5 (78.0-119.0)
	Yes	30 (47.6)	165.0 (122.0-206.0)	95.5 (76.0-129.5)
Income	\geq minimum wage	31 (49.2)	165.0 (132.0-216.0)	95.0 (78.0-129.5)
	<minimum wage	32 (50.7)	148.5 (122.0-184.0)	90.5 (76.0-119.0)
Occupation	High labor	44 (69.8)	154.0 (122.0-216.0)	92.0 (76.0-119.0)
	Low labor	19 (30.2)	159.5 (128.0-206.0)	85.5 (78.0-129.5)
Health insurance	Yes	45 (71.4)	155.5 (122.0-216.0)	93.0 (78.0-129.5)
	No	18 (28.5)	156.0 (127.0-198.5)	88.2 (76.0-113.0)
Diet	Regulating	46 (73.0)	153.0 (122.0-216.0)	91.5 (78.0-118.0)
	Not regulating	17 (26.9)	162.0 (136.0-206.0)	90.0 (76.0-129.5)
Smoking	No	31 (49.2)	158.7 (127.0-206.0)	90.0 (76.0-129.5)
	Yes	32 (50.7)	152.0 (122.0-216.0)	92.0 (78.0-118.0)
Physical activity	Routine	45 (71.4)	152.0 (122.0-216.0)	95.0 (76.0-129.5)
	Not routine	18 (28.5)	158.0 (127.0-198.5)	85.5 (78.0-113.0)
Adherence	High	15 (23.8)	132.0 (122.0-169.0)*	85.0 (78.0-97.0)*
	Low	48 (76.2)	164.5 (128.0-216.0)*	95.0 (76.0-129.5)*

Note: *Mann-Whitney test*; *p-value<0.05, significantly different; minimum wage, Regional Minimum Wage; BP, blood pressure; BMI, *Body Mass Index*.

Table V. Association between Hypertension Therapeutic Adherence with Blood Pressure Control

Adherence	Blood Pressure		p-value	OR (95% CI)
	Controlled n (%)	Uncontrolled n (%)		
High	9 (75.0)	6 (11.8)	<0.01	22.50 (4.73-107.05)
Low	3 (25.0)	45 (88.2)		

Note: p-value with *Fisher's Test*. P-value<0,05 significantly different. OR = odds ratio

The limitation of this study was the small number of respondents. The researchers did not use the formula of determining the number of respondents based on the number of population because there was no data on the number of population who had hypertension therapy in Ngemplak, Sleman, DIY. A preliminary research should be conducted on the population data of patients with hypertension therapy should be gathered first to determine the number of respondents, so that the results obtained could be more representative. In addition, the measurement of blood pressure on the respondents was only done in one time only and it did not reflect the actual blood pressure of respondents. Measuring blood pressure at other times was also recommended so that other factors such as distress and activity at the time of measurement of blood pressure would not affect the measurement results.

CONCLUSION

The average of Morisky score was 4.92 ± 1.94 . The value of adherence indicated low adherence to therapy. Based on the research, age, demography, lifestyle and social factors showed no significant difference in treatment adherence level in hypertensive respondents in Ngemplak District, Sleman, DIY (p-value>0.05). This means that the study factor did not affect the degree of adherence to one's therapy. From the research conducted, the level of adherence to therapy would be more influential on blood pressure control. It could be observed that subjects with high adherence had better blood pressure control (p-values <0.01, OR = 22.50 (95% CI: 4.73-107.05)).

REFERENCES

- Ahmed, S., 2015. Assessment of Adherence to Antihypertensive Treatment Among Patients Attending A Health Care Facility in North India. *Int J Res Med.*, 4 (1), 117-124.
- Ambaw, A.D., Getahun, A.A., Solomon, M., Yohanes., Zelalem, B.M., 2012. Adeherence to Antihypertensive Treatment and Associated factor Among Patients on Follow Up At University of Gondar Hospital, Northwest Ethiopia. *BMC Public Health*, 12 (282), 1-6.
- Arief, M., 2008. *Pengantar Metodologi Penelitian untuk Ilmu Kesehatan*.
- Chobanian, A.V., Bakris, G.I., Black, H.R., Cushman, W.C., Green, L.A., Izzo, J.I., et al., 2003. The Seventh Report of The Joint National Committee on Prevention, Detection, Evaluation, And Treatment of High Blood Pressure. *The JNC Report*, 289 (19), 2560-2572.
- Cuevas, C., Penate, W., 2015. Psychometric Properties of The Eight-Item Morisky Medication Adherence Scale (MMAS-8) in a Psychiatric Outpatient Setting. *Int J Clin and Health Psychol.*, 15, 121-129.
- Dahlan, M.S., 2013. *Statistik untuk Kedokteran dan Kesehatan*.
- Dehghan, M., Dehghan-Nayeri, N., Iranmanesh, S., 2015. Translation and validation of The Persian Version of The Treatment Adherence Questionnaire for Patients with Hypertension. *ARYA Atheroscler*, 12 (2), 76-86.
- Demoner, M.S., Ramos, P.E.R., Pereira, E.R., 2012. Factors Associated with Adherence to Antihypertensive Treatment in a Primary Care Unit. *Acta Paul Enferm*, 25 (1), 27-34.

- Despres, F., Perreault, S., Lalonde, L., Forget, A., Kettani, F.Z., Blasi, L., 2014. Impact of Drug Plans on Adherence to and the Cost of Antihypertensive Medications Among Patients covered by A Universal Drug Insurance Program. *Canadian Journal of Cardiology*, 30, 560-567.
- Dinas Kesehatan DIY, 2013. *Profil Kesehatan Daerah Istimewa Yogyakarta Tahun 2013*.
- Dinas Kesehatan Sleman, 2011. Kesehatan Usia Lanjut. <http://dinkes.slemankab.go.id/kesehatan-usia-lanjut>, accessed on 21 April 2016.
- Gosmanova, E.O., Mikkelsen, M.K., Molnar, M.Z., Lu, J.L., Yessayan, L.T., Kalantar-Zadeh, K., Kovesdy, C.P., 2016. Association of Systolic Blood Pressure Variability with Mortality, Coronary Heart Disease, Stroke, and Renal Disease. *J Am Coll Cardiol*, 68 (13), 1375-86.
- Hazwan, A., Pinatih, G.,N., 2017. Gambaran karakteristik penderita hipertensi dan tingkat kepatuhan minum obat di wilayah kerja puskesmas Kintamani I. *Intisari Sains Medis*, 8 (2), 130-134.
- Jin, J., Sklar, G.E., Oh, V.M.S., Li, S.C., 2008. Factors Affecting Therapeutic Compliance: A Review From Patient's Perspective. *Ther Clin Risk Manag.*, 4 (2), 269-283.
- Kamran, A., Sadeghieh A. S., Biria M., Malepour A., Heydari H., 2016. Determinants of Patient's Adherence to Hypertension Medications: Application of Health Belief Model Among Rural Patients. *Ann Med Health Sci Res.*, 6 (4), 922-927.
- Kementrian Kesehatan RI, 2013. *Riset Kesehatan Dasar: RISKESDAS 2013*.
- Kementrian Kesehatan RI, 2014. *Pusat Data dan Informasi Kementerian Kesehatan RI: Hipertensi*.
- Lee, G.K.Y., Wang, H.H.X., Liu, K.Q.L., Cheung, Y., Morisky, D.E., Wong, M.C.S., 2013. Determinants of Medication Adherence to Antihypertensive Medication Among a Chinese Population Using Morisky Medication Adherence Scale. 8 (4), 1-7.
- Li, W.T.L., Kang, C.D., Tsang, P., Wang, H., Liu, K., Chan, W.M., Wong, M.C.S., 2014. Determinants of Medication Adherence and Blood Pressure Control Among Hypertensive Patients in Hong Kong: A Cross-sectional Study. *Int J Cardio*, 14, 1-23.
- Morisky, D.E., Ang, A., Krousel-Wood M., Ward, H.J., 2008. Predictive Validity of A Medication Adherence Measure In An Outpatient Setting. *J Clins Hypertens*, 10 (5), 348-354.
- Najimi, A., Mostafavi, F., Sharifirad, G., Golshiri, P., 2016. Barriers to Adherence to Pharmacotherapy among Patient with Hypertension: A Cross-Sectional Study. *Int J Med Res Health Sci.*, 5 (7S), 46-53.
- National Health Service, 2016. Cause of High Blood Pressure (Hypertension). [http://www.nhs.uk/Conditions/Blood-pressure-\(high\)/Pages/Causes.aspx](http://www.nhs.uk/Conditions/Blood-pressure-(high)/Pages/Causes.aspx), accessed on 13 January 2017.
- Noorhidayah, S.A., 2016. *Hubungan Kepatuhan Minum Obat Antihipertensi Terhadap Tekanan Darah Pasien Hipertensi di Desa Salamrejo*.
- Pinto, E., 2006. Blood pressure and ageing. *Postgrad Med J.*, 83, 109-114.
- Pratiwi, I.P., dan Perwitasari, M., 2017. Analisis Faktor-Faktor yang Mempengaruhi Kepatuhan Pasien Hipertensi dalam Penggunaan Obat di RSUD Kadinah. *dalam: 2nd Seminar Nasional IPTEK Terapan, SENIT 2017*. 204-208.
- Puspita, E., 2016. *Faktor-Faktor yang Berhubungan dengan Kepatuhan Penderita Hipertensi dalam menjalani Pengobatan*.
- Ramli, A., Ahmad, N.S., Paraidathathu, T., 2012. Medication Adherence Among Hypertensive Patients of Primary Health Clinics in Malaysia. *Patient Preference and Adherence*, 2012 (6), 613-622.
- Rigby, D., 2015. Drug Adherence in Hypertension: Challenges and Opportunities. *Australas J Pharm.*, (96), 64-67.
- Saepudin, S.P., Hidayanti, P dan Ningsih, E.S., 2013. Kepatuhan Penggunaan Obat

- pada Pasien Hipertensi di Puskesmas. *Jurnal Farmasi Indonesia*, 6 (4), 249.
- Susilo, N.V., 2015. *Prevalensi, Kesadaran, Terapi, dan Pengendalian Tekanan Darah Responden 40-75 Tahun di Kecamatan Kalasan, Sleman, DIY (Kajian Faktor Umur dan Pengaturan Diet)*.
- Tan, X., Patel, I., Chang, J., 2014. Review of the four item Morisky Medication Adherence Scale (MMAS-4) and eight item Morisky Medication Adherence Scale (MMAS-8). *Inov Pharm*, 5 (3), 1.
- Vankatachalam, J., Abrahm, S. B., Singh, Z., Satya, S., 2015. Determinants of Patient's Adherence to Hypertension Medications in a Rural Population of Kancheepuram District in Tamil Nadu, South India. *Indian J Community Med.*, 40 (1), 33-37.
- Warren-Findlow, J., Seymour, R.B., Huber. L.R.B., 2012. The Association Between Self-Efficacy and Hypertension SelfCare Activities Among African American Adults. *J Community Health*, 37 (1), 5.